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AN INVESTIGATION INTO THE UTILISATION OF SOCIAL MEDIA TO FOSTER TEAM COLLABORATION IN A HIGHER EDUCATION INSTITUTION

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Abstract:

The COVID-19 pandemic introduced new challenges with subsequent opportunities to teach innovative ways of team collaboration. One example is the utilisation of social media to foster online team collaboration. This study investigates the use of Discord by students, a social media platform originally developed for online gamers, to collaborate virtually to complete project team tasks. The research question – what role a social media tool, namely Discord, plays in fostering team collaboration – was investigated using a qualitative, interpretative approach. Topic modeling identified ten themes, with the most vital theme indicating that students initially used Discord due to the academic requirement but later extensively used the platform because of its convenience and usefulness. Most students continued to use Discord even after completing their studies. While the main reason for adopting the tool was convenience due to peers using the platform, it became a logical and practical platform to communicate with friends, work on completing tasks together, and as a result, create a strong sense of belonging.

Keywords: Social media, Discord, Team collaboration, Higher education

I. INTRODUCTION

The 'Severe Acute Respiratory Syndrome Coronavirus 2' (SARS-CoV-2), also known as Corona, or COVID-19 [C-19], created havoc globally, forcing countries to implement measures in an attempt to combat the spread of the virus. One of the drastic measures included "lockdown," causing the restriction and even closure of many economies, schools, and universities [Dennis, 2020a; Wang & Huang, 2021; Weldon, Ma, Ho, & Li, 2021; Zheng, Lin, He, Freudenreich, & Liu, 2021].

Lockdown introduced many challenges across various sectors, one of which education was the most prevalent [Dennis, 2020a; Devlin & Samarawickrema, 2022; Elfirdoussi et al., 2020; García-Morales, Garrido-Moreno, & Martín-Rojas, 2021; Kandri, 2020; Van Slyke, Clary, & Tazkarji, 2022; Wang & Huang, 2021; Weldon et al., 2021; Zheng et al., 2021]. Forcing Higher Educational Environments to adopt an online teaching environment to continue teaching and learning, introducing endless challenges. For example - curricula and content were never designed for online learning; there was no time for proper planning and a phased approach to adoption; lecturers were not necessarily skilled in creating and delivering online content. Online tools and technologies were often foreign concepts to traditional classroom teaching and learning environments [Dennis, 2020b; Martin & Furiv, 2020; Weldon et al., 2021], and collaboration amongst team members became a considerable challenge.

The word "scrambling" accurately describes educators' efforts to find the best methods, tools, and technologies to foster student engagement and collaboration. These efforts accelerated the endless call to re-think traditional learning models, previously supported by a global need to make teaching and learning more accessible. In this instance, driven by a strong need to find solutions fast to retain the quality of education and ensure the completion of the academic year on time, a Unesco Press release affirmed that higher education institutions should "reimagine education and accelerate change in teaching and learning" [Guterres, 2020; Kandri, 2020].

Despite all the challenges, COVID-19 has accelerated the "appetite" for online learning and student collaboration and will continue to grow [Kandri, 2020]. What did become apparent very early during the pandemic was that although educators scrambled to get online, students were ready and waiting for

educators online. The main question for educators, however, was which technology to adopt and how it should be adopted. Despite the technological challenges, one cannot disregard the social aspects and impact of the pandemic. Driven by a clear goal to complete undergraduate teaching and learning tasks on time, social interaction became challenging. The lack thereof subsequently introduced loneliness, with widespread evidence outside HEI environments [Kandri, 2020; Zheng et al., 2021]. As a result, educators at an HEI realized how students were already utilizing an online social media platform, namely Discord, for undergraduate students, across different years of study. They use Discord to collaborate with peers during a time when physical interaction and collaboration were impossible with the objective of completing team tasks. This study was conducted post-COVID19 and aimed to investigate how the social media platform Discord fostered team collaboration during the pandemic. Discord and the portal to the metaverse were initially developed to communicate with friends during online gaming. It seems a logical tool to adopt given the target group, i.e., undergraduate students.

The paper starts with a short description of social media and Discord, followed by teaching and learning using social media as a platform. A brief research approach introduces an overview of the research method, which creates the landscape for the data analysis and discussion section, followed by a conclusion.

A social media platform is an online environment that allows users to interact informally with others who share the same interest [Manning, 2014]. Many social media platforms are available, all of which are growing in popularity daily. The most prevalent platforms include Facebook, YouTube, Whatsapp, and Instagram. Discord, a lesser-known platform, is a voice-over-internet protocol [VOIP] application and digital distribution platform designed for video gaming communities. Discord's functionality provides services to communities of different sizes (20 - 20,000 users in a single server) free of charge as a collaborative tool and a virtual meeting place "where you and your world can truly belong ... a place that makes it easy to talk every day and hangs out more often" [Citron, 2022].

III. TEACHING AND LEARNING USING SOCIAL MEDIA

A high-level scan of previously academically published articles, focusing on keywords such as "social media" AND "teaching and learning" AND "team collaboration" for the period 2012 to 2022 in academically published peer-reviewed journals, on the EBSCOHost platform, limited to English papers, retrieved 45 results after removing duplicates. The results suggest that there is scope for further research in the field, mainly focusing on Higher Education Institution's use of social media for teaching and learning purposes. This is important as the industry often expects students to have basic Web 2.0-related knowledge and skills upon graduation [Benson, Filippaios, & Morgan, 2010].

Higher Education Institutions have invested significant amounts of money in learning technologies, for example, Virtual Learning Environments [VLEs] such as Blackboard, Canvas, and D2L. However, these technologies have not yet universally been adopted and used by students and educators. Instead, students tend to use other, more familiar self-selected technologies not owned or controlled by their HEIs to support learning and prefer to use simple and convenient technologies that suit their needs, of which social media is often popular [Jang, 2015]. A study by Jang [2015] further suggests that online collaboration tools [such as social media] should therefore be designed by considering students' preferences. However, the use of technologies outside HEIs has implications for monitoring teaching and learning and the role of HEIs in creating a "learner-centered" learning environment. Despite this, external technological platforms remain important as learning does not only take place internally but rather through considering external networks, one of which can be a platform such as social media [Johnson, Roberts, Stout, Hill, & Wells, 2017].

Social media networks create an opportunity for students to generate distributive knowledge – often referred to as the connectivism learning theory. Although chaotic and sometimes complex, the social media platform network remains a structure through which learning occurs in a community through participation. One of the central principles of connectivism is that the person is responsible for self-learning, and "learning takes place within a person" [Brandao & Algarvio, 2020], deemed a more effective way of learning. As a result, learning outcomes are more often successfully achieved due to the ability to interact and share information among peers [Okoro, Hausman, & Washington, 2012]. Quick feedback from educators speeds up the learning process [Okoro et al., 2012]. They support the findings of a study conducted by Johnson et al. [2017] involving doctoral students investigating the role of social media (FB) in enhancing learning. The results suggested that social media positively contributed to the ability to communicate personally and academically and provided emotional support to students.

Therefore, it seems as if the benefits of social media in an HEI environment are not just limited to achieving team objectives but can also play a role in individual knowledge creation.

Another central theme of connectivism is that knowledge emerges through technology during the network activity and not from the technology itself (the so-called "non-human appliances"). A good example is provided by Yan [2019], whereby the authors used a specific social media technology (WeChat) to teach English writing to college students. The results indicated numerous benefits, such as improving team spirit, socializing, writing skills, peer-to-peer engagement, and learner-instructor interaction (to name a few) [Yan, 2019]. The social media platform, therefore, provides the platform for knowledge creation and is not necessarily linked to one specific technology. For example, a study conducted by Martínez-Cerdá, Torrent-Sellens, and González-González [2018] involving Science, Technology, Engineering, and Mathematics (STEM) students suggested that student collaboration skills, and subsequent subject knowledge, are improved when several ICT tools are used, for example, gamification technologies combined with social media. Irrespective of the technology used, the mere decision to use a particular social media platform forms part of the learning process itself [Brandao & Algarvio, 2020].

IV. RESEARCH APPROACH

This study followed a qualitative research approach with an interpretivist paradigm to understand how the social media tool Discord contributed to the effectiveness of team collaboration. A convenient purposive sample of undergraduate Informatics students at a tertiary institution in South Africa. Administrating a Qualtrics survey to 187 students contained multiple-choice and open-ended questions, which resulted in 172 usable responses, collecting general demographic information and specific information about each student's use of Discord. Students' perceptions and experiences with Discord were obtained by asking open-ended questions. Topic modeling, particularly the Latent Dirichlet Allocation (LDA) method named Rapid Miner (a data science tool) was used to analyze the unstructured, open-ended response. The questions ranged from Likert scale questions (For example: Accessing Discord was: Self-explanatory; Easy to Use; Time-consuming; Useful during the Covid-19 crises etc., where students selected on a range from agree to disagree) to open-ended questions where students could provide answers as to why they preferred using Discord. In total, there were 30 questions.

V. DATA PREPARATION

Participants' responses were obtained using Qualtrics and exported to a .csv file. The .csv file was imported into Excel and contained 231 records. The researchers engaged with the data in Excel with two main objectives: to familiarize themselves with it and perform first-level data cleansing tasks. These included removing records where the majority of fields were missing [some participants started the only survey but didn't complete it] and categorisation and classification of qualification levels because students could enter additional qualifications that were not available on the survey dropdown option [under the 'Other' item]. For example, the Baccalaureus in Information Technology (BIT) degree was captured as BIT (IS), BIT Information Systems or BI (Information Systems). Finally, some participants indicated they would not like to participate in the study, deleting it from the results set (8 records). Table 1 contains the detail about the data preparation process.

The final dataset contained 172 records for further analysis.

Table 1: Data preparation detail

	Number of records
Original dataset import	231
After removing empty records [lines]	210
After removing where no consent was given	202
After incomplete survey submissions were removed	172

VI. DATA ANALYSIS AND DISCUSSION

Topic modeling is a popular statistical approach used to analyse unstructured data [Kherwa & Bansal, 2020]. This machine learning technique, also known as unsupervised machine learning, automatically

classifies text data based on human intervention's occurrence or clusters of words without predefined classification [or tags]. As part of these techniques, "topics" are identified based on the estimated relations between words and their occurrence in documents. Each document can therefore contain numerous topics based on the relationship and often hidden links between themes [or groups of related topics]. These techniques have grown in popularity due to the abundant amounts of unstructured data available for analysis [such as Twitter data]. As a result, many techniques for topic modeling exist, for example, Structural Topic Model (STM) and Latent Dirichlet Allocation (LDA) (to name a few) [Kherwa & Bansal, 2020].

STM is a popular method for topic modeling as it considers underlying metadata in a data set as it occurs across many documents containing unstructured data. The metadata suggests underlying topics might emerge due to similar word choices. Due to the absence of data across multiple documents, with data collected in one document only for this study, the LDA method was selected and seemed appropriate. LDA is a widespread technique [Blei, Ng, & Jordan, 2003] as it provides insight into unstructured text data using clustering and reducing the number of attributes [also known as dimensionality reduction]. For example, similar texts are grouped or clustered into topics based on semantic similarity. The topics are then considered in a probability distribution using these topics as the basis. As a result, the words with the highest probability [also known as weights] describe the topic. The researchers considered a predefined number of topics before using this technique; this limitation didn't hamper the employment of this method in the study.

To analyse three text fields, used the "Extract Topics from LDA" was used to analyse free text fields.

Demographical data

The majority of participants in the study, all from one institution, were BCom Informatics students (67%), followed by BIT (Information Systems (IS)) (13%) and BIT students (6%). The following fields of participants in the study represented significantly less than 5% each: BSc (Information and Knowledge Systems) and BIS (Information Science), and BSc Geoinformatics (indicated as 'Other' on the pie chart, Fig. 1). It is important to note that BIT (Information systems) was a new degree that started in 2019 and was replacing the "old" BIT degree, however, there are still BIT students in the system who thus formed part of this study. The difference between the BCom Informatics degree and BIT (IS) are similar degrees presented by one department and offered in two different faculties.

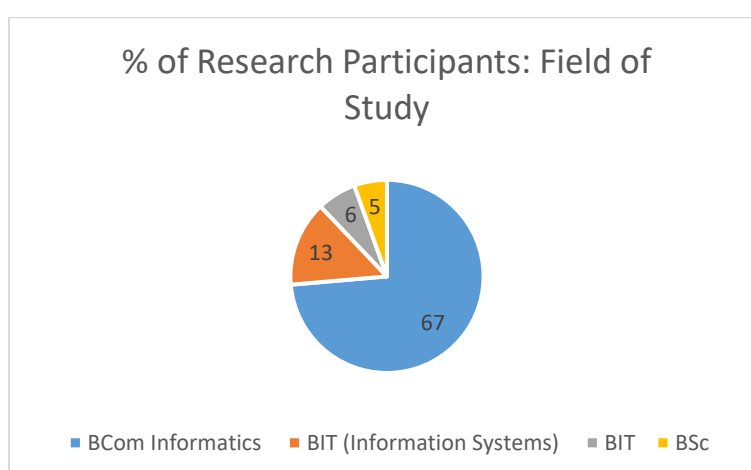


Figure 1: Research participant study areas

User profile and behavior

Discord was used the most by students in their first year of study across the different qualifications (36%), followed by students in their second year of study (34%) and third year of study (29%), with very few post-graduate students using Discord. It might be due to the target population selected at the time rather than an accurate indication of the utilization of social media technology amongst post-graduate students.

The average number of hours spent on Discord, irrespective of the qualification level and year of study, was 3.2 hours per day. BIS 2nd year students spend, on average, the most hours per day, namely 12.8, followed by BIT (Information Systems) 9.3 hours and BSc (Information and Knowledge Systems) second-year students (8 hours). First-year BCom general and first-year BSc extended program students spend the least hours on Discord, 1.5 hours per day. Students did not indicate how these hours were distributed between academic or team collaboration efforts and social interaction. Irrespective of the tasks completed by BIS 2nd-year students, 12.8 hours remain a considerably high value.

The most popular timeslot selected by participants using Discord was between 11:00 to 14:00, followed by 15:00 to 18:00. Most students used their server to connect to Discord (55%). In comparison, 45% of participants used an existing server for connection. Most participants used a laptop to connect to Discord (30%), while 25% of participants connected using a laptop and smartphone, and 11% used the above devices, including a PC. Students, therefore, had the infrastructure to use social media technology.

BCom Informatics students used Discord approximately 61 times per week to communicate with fellow Discord group members using the platform, followed by BIT (Information Systems) 13 times. Students in their second year of study, irrespective of the field of study, made the most connections. This is a substantial number of communication sessions and corresponds to the high number of hours students spend on the platform.

Discord usability:

A Likert scale was used to assess the platform's usability, with one being the lowest and five being the highest. Table 2 summarizes the average score as indicated by the student's year of study. Participants scored Discord high in terms of accessibility, informal but rewarding, useful during COVID and general, and finally, Discord was self-explanatory.

Participants scored Discord lower when it comes to being time-consuming and user-friendly.

Table 2: Survey Participant Discord usability scores

Year of study	Easy to access	Time consuming	User friendly	Informal but rewarding	Useful during COVID	Useful in general	Self-explanatory
1st Year	4.2	4.2	3.7	4.2	4.1	4.3	4.2
2nd Year	4.1	3.6	3.8	3.8	4.0	3.9	3.7
2nd Year and 3rd Year	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3rd Year	4.2	3.7	3.8	4.1	4.3	3.8	3.9
Hons	5.0	4.5	5.0	4.5	5.0	5.0	5.0
Overall Average	4.3	4	4.06	4.12	4.28	4.2	4.16

Surprisingly, the participants in their first year of study scored Discord lower on the user-friendliness measure but scored the other items in general higher than participants in the other years of study. The second-year students scored the most significant number of items below average. They are also the biggest group of participants in the study.

Most participants continued to use Discord beyond their studies, and in line with current literature, students base social media platforms as a choice of convenience [Jang, 2015]. It is, therefore, a sustainable tool to be used among students to collaborate with peers, irrespective of the objective [academic or social], and in line with findings by Yan [2019] that said:

- 73% of participants in their first year of study currently use Discord beyond their studies, while 27% are not using it anymore.
- 83% of participants in their second year of study currently use Discord beyond their studies, while 17% are not using it anymore.

- All participants in their second and third years of study [having subjects from both groups] continued to use Discord beyond their studies.
- 80% of participants in their third year of study currently use Discord beyond their studies.

Student / Discord interaction

From an education perspective, the initial objective for introducing Discord was to foster team collaboration at a time when physical contact was not feasible. The survey asked participants to indicate their motivation for using Discord. The LDA showed ten topics based on the degree of semantic similarity between high-scoring words in topics, using a coherence value to rank the topics in the order of most occurrences. Table 3 displays the highest-ranked topics from the most to the least occurrences. The keywords and their meanings are grouped based on the broad context of the unstructured data, interpreting the meaning of the keywords in the study context.

Table 3: Top 10 motivational topics based on topic analysis and interpretation

Topic importance Ranking	Keywords	Meaning and Interpretation
Topic 7	Group, INF, discord, work, friends	Course requirement The main reason and strongest theme that emerged was that participants originally joined Discord because it was a requirement for their Informatics [INF] academic study group. Subsequently, their friends were also using Discord at the time, a logical platform to connect with friends. As a starting point, convenience (similar to findings by Jang [2015]), together with the academic requirement, was the main driving force of adoption and utilisation.
Topic 4	Used, different, useful, server, one	Useful The second highest topic occurrence suggested the usefulness theme- using one server for all Informatics academic projects was useful. Discord was a convenient method to foster team collaboration in line with current research [Jang, 2015]. The study further suggests that online collaboration tools (such as social media) should be designed considering students' preferences.
Topic 3	Channels, files, created, wanted, easily	File sharing It was easy to use Discord as a channel for sharing files. A study by Zaidieh [2012] highlights convenience and accessibility as the foremost opportunity created by social media whereby students can easily share, review and update academic material. Given the high occurrence of the topic, it worked well to enable team collaboration on the Informatics project.
Topic 5	Platform, communicate, play, meetings, easy	Communication It was easy to have one platform to use for meetings and to communicate with fellow members. Students also used to play games with friends. Although developing social media platform skills was not an objective for introducing Discord, students developed these skills. As Martínez-Cerdá et al. [2018] indicated that gamification in social media platforms positively contributes to student skills.
Topic 0	Software, screen, present, feature, whilst	File sharing The software has many useful features that allow sharing of work with everyone present, increasing team collaboration efforts.
Topic 1	Year, reasons, complete, modules, fellow	Course requirement

		The original reasons for students joining Discord were to interact on academic semester modules and foster collaboration across modules.
Topic 2	Play, referred, ideas, xBox, moved	Gaming Participants used Discord to play games instead of using xBox. As Martínez-Cerdá et al. [2018] indicated that gamification in social media platforms positively contributes to student skills.
Topic 9	Able, communicate, team, keep, offers	Communication The tool allowed participants to communicate and keep up with team members, increasing collaboration.
Topic 6	Organised, team, posted, text, including	Organization The tool allowed participants to organize their teams.
Topic 8	Purposes, assignment, already, module, lockdown	Course requirement The tool allowed participants to connect to their module to complete assignments during lockdown.

Analysing the occurrence of individual words, the unstructured response text, and the words communicate, play, and the team was the most prevalent (see Figure 2). This indicates the main objective of participants, namely, to communicate with team members, as this was an academic requirement (in line with the most prevalent topic, 7). As an unintentional consequence, participants also used the platform to socialize (or play games) with team members.



Figure 2: Word cloud - reasons for using Discord

Asking respondents what the main reason for using Discord was. Survey options for selection were academic support, learning community, social community, gaming, emotional support, and others. Most BCom Informatics students (the highest number of participants) selected academic support as their main reason. Furthermore, 16% of BCom Informatics students indicated using it for academic support and as a learning community, while 5% of the BCom Informatics participants indicated that the learning community became their social community. 14% of participants stated that they used it for academic support and gaming, while 11% of participants solely used it to create a learning community for themselves. Only 9% of participants solely used Discord for gaming purposes.

The collective percentages, irrespective of the academic study level of participants, indicated that Discord was mainly used for academic support, followed by gaming and to create a learning community (Figure 3). This is similar to findings by Johnson et al. [2017] that highlighted these benefits amongst individual postgraduate students, including emotional support.

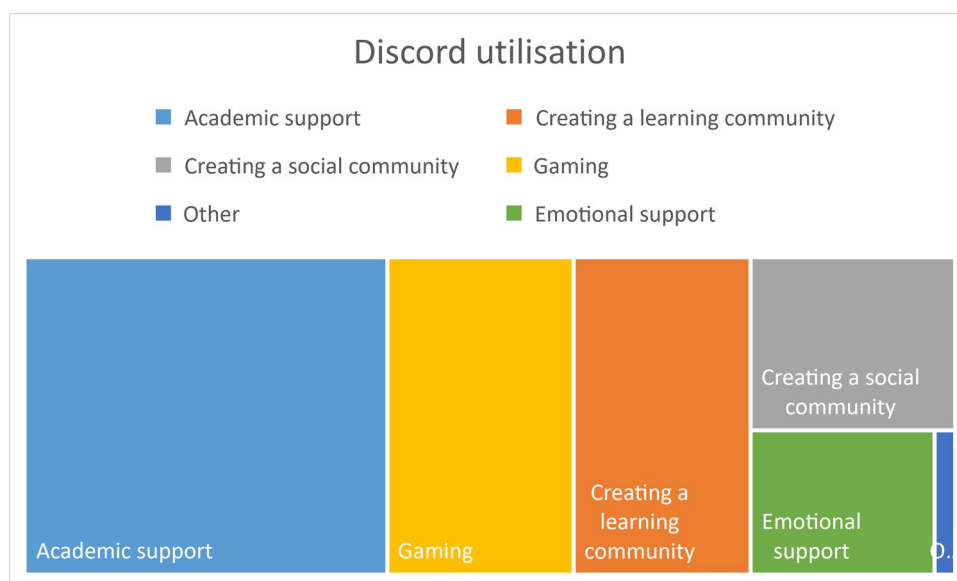


Figure 3: What Discord was used for [irrespective of the field of study]

Participants further indicated that they would like to use Discord as the primary tool in the future to connect with lecturers and academic staff (26%). This is followed by Clickup (15%) (an institutional-based e-learning system) and Google Meet (14%), which is currently the institutional standard for the participants in the study. Other noteworthy tools mentioned by students is Zoom, Blackboard collaborate [part of Clickup], and Whatsapp. Participants furthermore provided comments about the tools they used:

“Teamspeak and Discord has the best sound quality and using discord to shares screens is pretty nice”.

“Discord has been useful so that if they feel comfortable, or ClickUP if they can get more organised there.” Clickup is the most familiar environment currently used by the institution.”

VII. SUMMARY OF KEY FINDINGS

Overall (across all the different degree programs), most students used Discord for academic support [39%], followed by creating a learning community (19%), of which team collaboration was essential. However, it was also extensively used for gaming (20%), as a social community, 12%, and 9% emotional support. As a result, Discord played an essential role in attaining social media knowledge and skills, including team collaboration skills.

Besides Discord, Clickup (the institutional learning management system) was the preferred tool for creating a learning community, followed by Google Hangouts/Meet. These are also the official institutional tools for creating learning communities. This is in line with a study by Hrastinski and Aghaee [2012] that found that social media played an essential role in the educational process amongst students, followed by face-to-face contact sessions (which was not feasible during the pandemic) and institutional learning management system (Clickup).

Convenience and ease of use of social media tools fostered team collaboration and were important considerations when students considered continuous use of tools. Based on this, Discord remained the most popular collaboration tool in the first, second, and third years.

IX. CONCLUSION

In conclusion, through the social media platform Discord, the data analysis informs the HEIs of potential future improvements when adopting tools and technologies for teaching and learning, including team member collaboration. As a result, HEI adheres to students' needs by creating a community and subsequently fostering a sense of belonging amongst students. For example, it became the logical platform to connect with friends due to its extensive use. It was a valuable and easy-to-use server for

all study projects, meetings, communication, interaction sharing of files, and recreation [preferred Discord instead of using Xbox]. The tool allowed participants to communicate and keep up with team members and subsequently organize their teams. The preliminary analysis suggests that Discord can be essential in fostering team collaboration, even beyond the pandemic. Furthermore, it lays the foundation for developing valuable social media knowledge and skills often required by industry practitioners.

The study contributes to implementing appropriate, innovative teaching and learning tools that foster students' sense of belonging and improve student academic performance. It is, however, essential to note that this study only investigated Discord and no other social media platforms and thus recommend further studies in the social media field.

Although topic modeling was an appropriate method for analysing free text fields, this provided valuable input on the reasons for using and continuing to use Discord. The LDA results should only be used as a starting point to explore the true meaning in context.

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